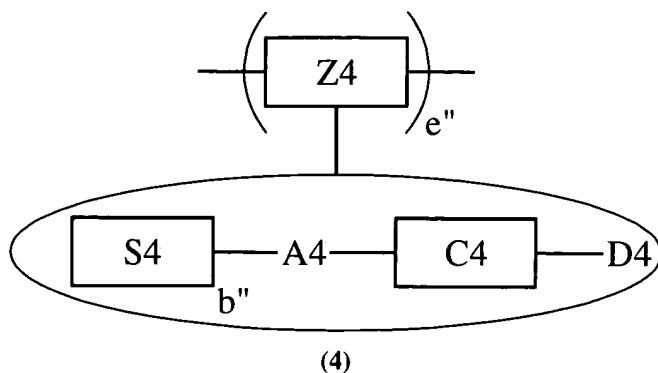


**WE CLAIM:**

1. A compound having formula (4)



wherein:

- D4 is an electron donor moiety;
- C4 is a conjugated bridging moiety;
- A4 is an electron acceptor moiety;
- S4 is a hydrocarbon, a heterocyclic moiety, or a hetero-acyclic moiety;
- b'' is an integer;
- Z4 is a polymerizable moiety; and
- e'' is the degree of polymerization.

2. The compound of claim 1, wherein D4 is selected from the group consisting of:

- (a) an atom selected from the group consisting of N, O, S, P, Cl, Br, and I where the valence of the atom is satisfied by bonding with C4 and optionally with Z4;
- (b) an atom selected from the group consisting of N, O, S, and P bonded to C4, and optionally with Z4, where the atom also is bonded to at least one other moiety to satisfy the valence of the atom;
- (c) ferrocenyl;
- (d) azulenyl; and
- (e) at least one aromatic heterocyclic ring.

3. The compound of claim 1, wherein C4 is selected from the group consisting of:

- (a) at least one aromatic ring;

- (b) at least one aromatic ring conjugated through one or more ethenyl or ethynyl bonds; and
- (c) fused aromatic rings.

4. The compound of claim 1, wherein A4 is selected from the group consisting of:

- (a) a carbonyl group;
- (b) a carboxyl group;
- (c) a sulphone;
- (d) an alkene; and
- (e) an imine group.

5. The compound of claim 1, wherein the hydrocarbon of S4 is selected from the group consisting of:

- (a) a straight chain alkyl group;
- (b) a branched alkyl group;
- (c) at least one cycloalkyl group, optionally substituted with an alkyl group, an arylalkyl group, an alkylaryl group, a cycloalkyl group, or an alkylcycloalkyl group; and
- (d) an arylalkyl group or an alkylaryl group.

6. The compound of claim 1, wherein S4 includes a liquid crystal moiety.

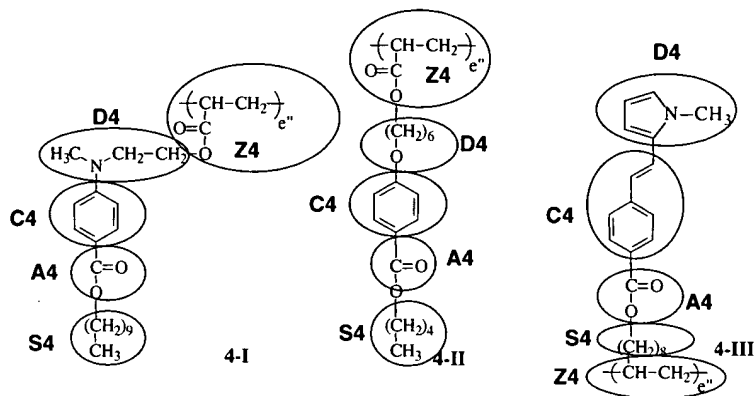
7. The compound of claim 1, wherein Z4 is selected from the group consisting of:

- $\text{H}_2\text{C}=\text{CH}-\text{C}(\text{O})-\text{O}-$  (acryl),
- $\text{H}_2\text{C}=\text{C}(\text{CH}_3)-\text{C}(\text{O})-\text{O}-$  (methacryl),
- $\text{H}_2\text{C}=\text{C}(\text{C}_2\text{H}_5)-\text{C}(\text{O})\text{O}-$  (ethacryl),
- $-\text{CH}=\text{CH}_2$  (vinyl), and
- $-\text{C}(\text{CH}_3)=\text{CH}_2$ .

8. The compound of claim 1, wherein Z4 includes a substitution with a moiety selected from the group consisting of:

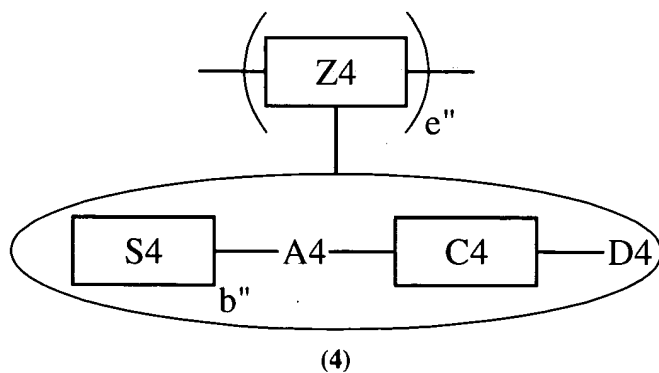
- (a) an alkyl chain; and
- (b) a substituted alkyl chain selected from the group consisting of: an alkoxy, a halide substituted alkyl group, and an amino-alkyl group.

9. The compound of claim 1, wherein the compound of formula (4) is selected from the group consisting of:



wherein S4, A4, C4, D4, and Z4 are indicated.

10. A composition comprised of a liquid crystal and a compound having formula (4)



wherein:

- D4 is an electron donor moiety;
- C4 is a conjugated bridging moiety;
- A4 is an electron acceptor moiety;
- S4 is a liquid crystal compatibilizing moiety;
- b" is an integer;
- Z4 is a polymerizable moiety; and
- e" is the degree of polymerization.

11. The composition of claim 10, wherein D4 is selected from the group consisting of:

- (a) an atom selected from the group consisting of N, O, S, P, Cl, Br, and I where the valence of the atom is satisfied by bonding with C4 and optionally with Z4;
- (b) an atom selected from the group consisting of N, O, S, and P bonded to C4, and optionally with Z4, where the atom also is bonded to at least one other moiety to satisfy the valence of the atom;
- (c) ferrocenyl;
- (d) azulenyl; and
- (e) at least one aromatic heterocyclic ring.

12. The composition of claim 10, wherein C4 is selected from the group consisting of:

- (a) at least one aromatic ring;
- (b) at least one aromatic ring conjugated through one or more ethenyl or ethynyl bonds; and
- (c) fused aromatic rings.

13. The composition of claim 10, wherein A4 is selected from the group consisting of:

- (a) a carbonyl group;
- (b) a carboxyl group;
- (c) a sulphone;
- (d) an alkene; and
- (e) an imine group.

14. The composition of claim 10, wherein S4 is a hydrocarbon selected from the group consisting of:

- (a) a straight chain alkyl group;
- (b) a branched alkyl group;
- (c) at least one cycloalkyl group, optionally substituted with an alkyl group, an arylalkyl group, an alkylaryl group, a cycloalkyl group, or an alkylcycloalkyl group; and
- (d) an arylalkyl group or an alkylaryl group.

15. The composition of claim 10, wherein S4 includes a liquid crystal moiety.

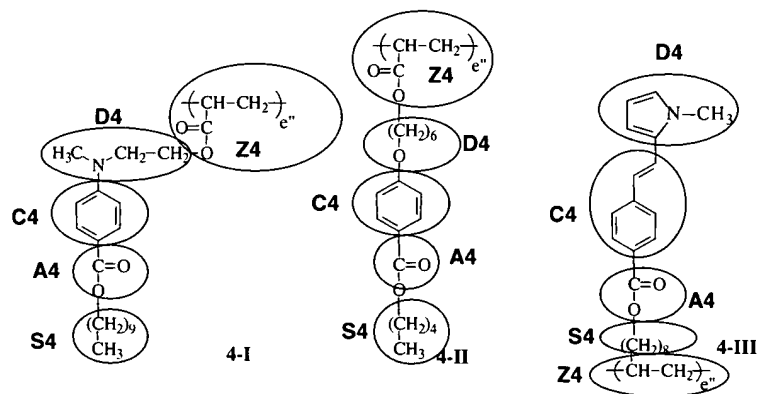
16. The composition of claim 10, wherein Z4 is selected from the group consisting of:

$\text{H}_2\text{C}=\text{CH}-\text{C}(\text{O})-\text{O}-$  (acryl),  
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)-\text{C}(\text{O})-\text{O}-$  (methacryl),  
 $\text{H}_2\text{C}=\text{C}(\text{C}_2\text{H}_5)-\text{C}(\text{O})\text{O}-$  (ethacryl),  
 $-\text{CH}=\text{CH}_2$  (vinyl), and  
 $-\text{C}(\text{CH}_3)=\text{CH}_2$ .

17. The composition of claim 10, wherein Z4 includes a substitution with a moiety selected from the group consisting of:

- (a) an alkyl chain; and
- (b) a substituted alkyl chain selected from the group consisting of: an alkoxy, a halide substituted alkyl group, and an amino-alkyl group.

18. The composition of claim 10, wherein the compound of formula (4) is selected from the group consisting of:



wherein S4, A4, C4, D4, and Z4 are indicated.